THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

Paper No. 30

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

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Ex parte EVELYN CHIN, FRANCIS M. HOULIHAN
and OMKARAM NALAMASU

_____

Appeal No. 1997-1301
Application No. 08/079,310

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HEARD: May 18, 2000

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Before WARREN, WALTZ, and KRATZ, ***Administrative Patent Judges***.

WALTZ, ***Administrative Patent Judge***.

DECISION ON APPEAL

This is an appeal under 35 U.S.C. § 134 from the examiner's final rejection of claims 1 through 5. Claims 6 to 8, the remaining claims in this application, stand withdrawn from further consideration by the examiner (Brief, page 2; Final Rejection, cover page).

According to appellants, the invention is directed to a process for fabricating a semiconductor device wherein the radiation sensitive region comprises an acid generator which is an "-substituted ortho-nitro benzyl ester where F* of the "-substituent is at least 1.5 (Brief, page 2). Claim 1 is illustrative of the subject matter on appeal and a copy of this claim is reproduced below:

> 1. A process for fabricating a device comprising the steps of forming a radiation sensitive region on a substrate, exposing said region to said radiation, developing in said region a pattern defined by said exposure, and transferring said pattern into the underlying material, characterized in that said radiation sensitive region comprises a material including (1) a material that undergoes a reaction in response to an acidic moiety and (2) an acid generator comprising an "-substituted ortho nitro benzyl ester wherein the F* for said "-substituent is at least 1.5.

The examiner has relied upon the following references as evidence of obviousness:

Houlihan et al. (Houlihan) 5,135,838 Aug. 4, 1992

Reichmanis et al. (Reichmanis), "Chemical Amplification Mechanisms for Microlithography," ***Chem. Mater.,*** 3, pp. 394-407, 1991.

Appellants cite and refer to the following references in rebuttal of the examiner's evidence of obviousness (Reply Brief, pages 13 and 14):

Houlihan et al. (Houlihan '136) 4,996,136 Feb. 26, 1991

March, ***Advanced Organic Chemistry,*** 4th ed., pp. 342-43 (1992).

Claims 1 through 5 stand rejected under 35 U.S.C. § 103 as unpatentable over Houlihan in view of Reichmanis (Answer, page 3).[1] We ***reverse*** this rejection essentially for the reasons cogently stated by appellants on pages 7-15 of the Reply Brief. We add the following comments primarily for emphasis and completeness.

OPINION

The examiner states that Houlihan discloses nitro benzyl sulfonyl ester photoacid generators which are "similar" to the claimed photoacid generators except that the claimed photo

[1]This is a new ground of rejection advanced by the examiner on page 3 of the Answer. The final rejections of claims 1-5 under 35 U.S.C. § 112, first and second paragraphs, and under 35 U.S.C. § 103 in view of Houlihan (U.S. Patents Nos. 4,996,136 or 5,135,838) have all been withdrawn (Answer, page 2).

acid generators have a substituent with particular steric and electronic properties on the alpha carbon of the benzyl group

while Houlihan discloses these same substituents on the ortho carbon of the benzyl ring (i.e., the 6-position; see the Answer, paragraph bridging pages 3-4).

The examiner applies Reichmanis for the disclosure of Scheme III on page 398 which sets forth the reaction mechanism for photogeneration of sulfonic acid via a heterocyclic intermediate (Answer, page 4). The examiner concludes that

> [t]he presence of the electron withdrawing group on the alpha carbon would also lead to increased steric hindrance and increased electronic stabilization during the light induced photoacid generation. . . . The presence of the electron withdrawing group on the alpha carbon would clearly lead to increased steric hindrance of the nitro benzyl sulfonyl ester and the intermediate compound with the heterocyclic ring. . . .
>
> The proximity of the electron withdrawing group to the sulfonyl group would facilitate the cleavage of the organosulfonyl acid leaving group. (Answer, pages 4-5).

However, the examiner provides no convincing evidence or reasoning to support his theory and thus his conclusion. ***In re Warner,*** 379 F.2d 1011, 1017, 154 USPQ 173, 178 (CCPA 1967)("Where the legal conclusion of obviousness is not supported by facts it cannot stand."). The teachings of Houlihan at col. 4, ll. 8-58 are directed to the effect of the

substituent at the 6-position on the benzyl ring, and Houlihan is silent regarding substitution

of the alpha-substituent. Reichmanis teaches the same effect for substituents at the 6-position as Houlihan and also is silent regarding any substitution at the alpha carbon of the benzyl group (see Reichmanis, page 398, right column). Considering the entire scope of the prior art, Houlihan '136 discloses alpha substitution of nitrobenzyl sulfonyl esters useful as photoacid generators but teaches that the alpha substituent is "advantageously H or CH_3." (see col. 2, l. 68; Reply Brief,
page 14). On this record, both of these substituents yield a F* much less than the claimed requirement of "at least 1.5." (see the Brief, page 11). Accordingly, from the prior art as a whole, we find no motivation or reasoning for making the substitution proposed by the examiner, much less a substitution that yields the F* values required by claim 1 on appeal. ***In re Dembiczak,*** 175 F.3d 994, 999, 50 USPQ2d 1614, 1617 (Fed. Cir. 1999)("Broad conclusionary statements regarding the teaching of multiple references, standing alone, are not 'evidence' [of a suggestion, teaching or motivation to combine references].").

Furthermore, we find an inconsistency in the examiner's reasoning that one of ordinary skill in the art would have been

motivated to substitute an electron withdrawing substituent at the alpha carbon of the benzyl group to facilitate the intramolecular rearrangement set forth in Scheme III of Reichmanis. Scheme III as disclosed by Reichmanis shows the generation of acid through the well known ortho-nitrobenzyl photochemically induced rearrangement (see page 398). The teachings of Houlihan at col. 4, ll. 8-58, are relied upon by the examiner to show that increased steric hindrance and electron withdrawing characteristics provide improved thermal stability (Answer, page 5). Thus the examiner is proposing to combine the teachings of two different effects, namely the effect of substituents on photo-induced generation of acid and the effect of substituents on the temperature at which the acid generator decomposes during the post exposure baking (see Houlihan, col. 4, ll. 14-24). Furthermore, all of these effects are taught for substituents at the 6-position of the benzyl ring and the examiner has not shown why these teachings

would have been applicable by one of ordinary skill in the art to alpha carbon substituents.

The examiner has not presented any convincing evidence or reasoning as to why the proposed substitution at the alpha carbon of the benzyl group would facilitate the reaction set forth in Scheme III of Reichmanis. The heterocyclic intermediate in Scheme III of Reichmanis is formed by removal of a hydrogen atom from the alpha carbon of the benzyl group (page 398). The examiner has not explained or presented reasoning why an ***electron-withdrawing*** group would not make removal of this hydrogen more difficult, rather than facilitate its removal (see the Reply Brief, page 10).

For the foregoing reasons and those presented in the Reply Brief, we determine that the examiner has not established a ***prima facie*** case of obviousness. In light of this determination, we need not consider the sufficiency of appellants' evidence of unobviousness (e.g., the Houlihan Declaration under 37 CFR § 1.132 dated Jan. 13, 1997, Paper No. 22). ***In re Geiger,*** 815 F.2d 686, 688, 2 USPQ2d 1276, 1278 (Fed. Cir. 1987). Accordingly, the examiner's rejection of claims 1-5 under 35 U.S.C. § 103 as unpatentable over Houlihan in view of

Reichmanis is reversed.

The decision of the examiner is reversed.

REVERSED

CHARLES F. WARREN Administrative Patent Judge	)
THOMAS A. WALTZ Administrative Patent Judge	) BOARD OF PATENT APPEALS AND INTERFERENCES
PETER F. KRATZ Administrative Patent Judge	)

PFK/sld

Appeal No. 1997-1301
Application No. 08/079,310

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Appeal No. 1997-1301
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REVERSED

Prepared: January 25, 2001